

Application No. 10/708,020
Technology Center 1775
Amendment dated November 6, 2006
Reply to Office Action dated September 6, 2006

REMARKS

In the Office Action, the Examiner reviewed claims 1-20 of the above-identified US Patent Application, with the result that all of the claims were rejected under 35 USC §§103 and 112. Applicants respectfully request reconsideration and withdrawal of the rejections for the following reasons.

Rejection under 35 USC §112, Second Paragraph

Claims 1-20 were rejected under 35 USC §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter that Applicants regard as their invention. Applicants respectfully request favorable reconsideration in view of the following.

The Supreme Court in *Eibel Process Company v. Minnesota & Ontario Paper Company*, 261 U.S. 45, 65-66 (1923), stated the basis for a rejection on the grounds of indefiniteness as follows:

Indefiniteness is objectionable because the patent does not disclose to the public how the discovery, if there is one, can be made useful and how its infringement may be avoided.

MPEP §2173.02 requires that:

Application No. 10/708,020
Technology Center 1775
Amendment dated November 6, 2006
Reply to Office Action dated September 6, 2006

Definiteness of claim language must be analyzed, not in a vacuum, but in light of (1) the content of the particular application disclosure, (2) the teachings of the prior art, and (3) the claim interpretation that would be given by one possessing the ordinary level of skill in the pertinent art at the time the invention was made.

Finally, MPEP §2173.02 states that the claims merely need to set out and circumscribe the claimed subject matter "with a *reasonable* degree of clarity and particularity" in order to comply with 35 USC §112, second paragraph (emphasis added).

The Examiner's concern was for the limitation in independent claims 1 and 17 that

the second ceramic layer [has] vertical microcracks that extend through the thickness of the second ceramic layer in an amount sufficient to cause the second ceramic layer to be more erosion resistant than the first ceramic layer.

The Examiner explained

"the term "an amount sufficient to" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably appraised of the scope of the invention.

Application No. 10/708,020
Technology Center 1775
Amendment dated November 6, 2006
Reply to Office Action dated September 6, 2006

In response, Applicants direct the Examiner's attention to the following description from their specification:

the erosion resistance of the outer layer 22 is improved to an acceptable level as a result of the manner in which the outer layer 22 is deposited, namely, thermal sprayed to have a microstructure referred to herein as dense vertical microcracks (DVM). . . . A preferred process for depositing the outer layer 22 is that taught in U.S. Patent No. 5,073,433. As a result of this process, the outer layer 22 contains numerous vertical microcracks 24, preferably at least twenty-five cracks per linear inch of surface, with at least some of the microcracks 24 extending completely through the outer layer 22 to its interface with the inner layer 20. . . . As a result of the different deposition techniques used, the inner layer 20 is characterized by a low thermal conductivity as a result of the APS deposition process, while the outer layer 22 is more erosion resistant than the inner layer 20, notwithstanding the fact that the fully-stabilized zirconia material of the outer layer 22 is known to be less erosion resistant than the partially-stabilized zirconia material of the inner layer 20.

Paragraph [0019]

From the above, Applicants respectfully believe that their specification provides ample support to clarify the invention recited in claims 1 and 17 to one having ordinary skill in the art. Specifically, one would understand that "the erosion resistance of the outer layer 22 is improved to an acceptable level as a result of the manner in which the outer layer 22 is deposited, namely, thermal sprayed to

Application No. 10/708,020
Technology Center 1775
Amendment dated November 6, 2006
Reply to Office Action dated September 6, 2006

have a microstructure referred to herein as dense vertical microcracks (DVM)," would understand how to deposit the outer layer 22 to have the vertical microcracks 24 (in view of the cited patents), and would understand that the outer layer 22 preferably contains "at least twenty-five microcracks per linear inch of surface" in order for it to be "more erosion resistant than the inner layer 20." Therefore, "at least twenty-five microcracks per linear inch of surface" provides "a standard for ascertaining the requisite degree" for claims reciting "vertical microcracks . . . in an amount sufficient to cause the second ceramic layer to be more erosion resistant than the first ceramic layer."

In view of the above, Applicants respectfully request withdrawal of the rejection under 35 USC §112, second paragraph.

Rejections under 35 USC §103

Independent claims 1 and 17 and their dependent claims 2-16 and 18-20 were rejected under 35 USC §103(a) as being unpatentable over U.S. Patent No. 6,887,595 to Darolia et al. (Darolia) in view of U.S. Patent No. 4,377,371 to Wisander et al. (Wisander), and as being unpatentable over U.S. Patent No. 6,764,779 to Lui et al. (Lui) in view of Wisander. Applicants respectfully request reconsideration in view of the following comments.

Application No. 10/708,020
Technology Center 1775
Amendment dated November 6, 2006
Reply to Office Action dated September 6, 2006

The present §103 rejections differ from the §103 rejections set forth in the previous rejection only by the substitution of Wisander for U.S. Patent No. 6,716,539 to Subramanian, which is no longer applied in any rejection. Therefore, Applicants' previous arguments regarding Darolia and Lui will not be repeated here, but are incorporated herein by reference.

Wisander was cited for disclosing a zirconia layer in which

Vertical microcracks are generated in the coating by scanning a laser beam over the plasma-sprayed ceramic surface (column 2, lines 11-12). These cracks provide . . . improved erosion resistance for the thermal barrier coating.

However, nowhere does Wisander disclose or suggest that the cracks are "vertical," as required by claims 1 and 17 (Figure 2 of Wisander is of such poor quality as to make any further clarification extremely difficult). Furthermore, Wisander's cracks form within "a thin, uniform, fused layer on top of the plasma-sprayed ceramic surface" (column 2, lines 57-58) described as initially being a "thin layer about 0.005 inch thick melted at the surface" (column 2, lines 59-60) that "forms a continuous dense layer on top of the plasma-sprayed ceramic substrate" (column 2, lines 60-62), which during cooling forms "cracks extending a few mils into the ceramic structure" (column 2, lines 64-65). Though Wisander states "some secondary microcrack damage may be done

Application No. 10/708,020
Technology Center 1775
Amendment dated November 6, 2006
Reply to Office Action dated September 6, 2006

below this surface" (presumably the surface of the "continuous dense layer), "cracks extending a few mils into the ceramic structure" do not extend through the "continuous dense layer" since the "continuous dense layer" is thicker than "a few mils" (as a result of being formed by cooling the 0.005 inch thick molten layer). Therefore, contrary to Applicants' claims, Wisander does not appear to disclose or suggest cracks extending through Wisander's "continuous dense layer" and into the "plasma-sprayed ceramic substrate" on which the "continuous dense layer" is formed. Stated another way, Wisander does not appear to disclose or suggest Applicants' "thermal-sprayed noncolumnar second ceramic layer" in which "vertical microcracks . . . extend through the thickness of the second ceramic layer."


In view of the above, Applicants believe that Wisander cannot be said to supplement the teachings of either Darolia or Lui in order to arrive at Applicants' invention. Applicants therefore respectfully request withdrawal of the §103 rejections to the claims.

Application No. 10/708,020
Technology Center 1775
Amendment dated November 6, 2006
Reply to Office Action dated September 6, 2006

Closing

Should the Examiner have any questions with respect to any matter now of record, Applicants' representative may be reached at (219) 462-4999.

Respectfully submitted,

By 
Domenica N.S. Hartman
Reg. No. 32,701

November 6, 2006
Hartman & Hartman, P.C.
Valparaiso, Indiana 46383
TEL.: (219) 462-4999
FAX: (219) 464-1166